

SUPPLEMENTAL DIRECT TESTIMONY OF
THOMAS L. JOAQUIN

SENIOR VICE PRESIDENT
OPERATIONS
HAWAIIAN ELECTRIC COMPANY, INC.

Subject: Overview of Supplemental Direct Testimonies

INTRODUCTION

Q. Please state your name and business address.

A. My name is Thomas L. Joaquin and my business address is 820 Ward Avenue,
Honolulu, Hawaii.

Q. Have you previously submitted testimony in this proceeding?

A. Yes. I submitted written direct testimony and exhibits as HECO T-1.

Q. What is the scope of your supplemental testimony?

A. My testimony will provide an overview of the issues in this case and the various
supplemental testimonies that support HECO's application filed on
December 18, 2003 as part of Docket No. 03-0417.

Q. What has HECO requested by its Application filed in this docket?

A. HECO requested Commission approval to commit funds in excess of \$500,000
(then estimated at \$55,424,000) for Item Y48500, East Oahu Transmission
Project, in accordance with the provisions of Paragraph 2.3(g)(2) of General Order
No. 7. HECO also requested a favorable Commission determination be made that
the new 46kV lines for the East Oahu Transmission Project be built below the
surface of the ground pursuant to HRS Section 269-27.6 (a).

Q. What is the purpose of the proposed project?

A. The purpose of the East Oahu Transmission Project is to address several
transmission problems that can affect system reliability, including:

- 1) The Koolau/Pukele Overload Situation;
- 2) The Downtown Overload Situation;
- 3) The Pukele Substation Reliability Concern; and
- 4) The Downtown Substation Reliability Concern.

The Koolau/Pukele Overload Situation involves potential transmission line

overloads in HECO's 138kV Northern transmission corridor starting in 2005. The Downtown Overload Situation involves potential transmission line overloads in HECO's 138kV Southern transmission corridor starting in 2023. The Pukele Substation Reliability Concern involves the reliability of the Pukele Substation located at the end of 138kV Northern transmission corridor. Pukele Substation serves 16% of Oahu's power demand, which includes critical loads such as Waikiki, State Civil Defense, the Hawaii Army and Air National Guard Headquarters, and the University of Hawaii. The Downtown Substation Reliability Concern involves the reliability of Archer Substation, Kewalo Substation and Kamoku Substation located at the end of HECO's 138kV Southern transmission corridor. These substations serve critical loads such as the Honolulu Police Department Headquarters and the Hawaii Convention Center.

Q. How does HECO plan to implement the project?

A. HECO proposes to implement the project in two independent phases, Phase 1 and Phase 2. As described in the Application, Phase 1 involves the installation of 0.9 miles of underground ductline for 46kV subtransmission lines, and related work at eight substations, in order to interconnect three 46kV circuits out of the Pukele Substation, at the end of HECO's Northern 138kV transmission corridor, to four 46kV lines connected to HECO's Southern 138kV transmission corridor. Phase 1 includes: (1) the installation of six underground 46kV lines in the Ala Moana, McCully, Moiliili, and Kapahulu areas, (2) a 138kV/46kV transformer installation at the existing Kamoku Substation with associated protective relaying, and (3) modifications of various existing distribution substations in the Honolulu area.

As described in the Application, Phase 2 involves the installation of 1.9

1 miles of underground ductline for 46kV subtransmission lines, and related work at
2 one substation, in order to interconnect four out of the five remaining 46kV
3 circuits out of the Pukele Substation to three other 46kV lines connected to
4 HECO's Southern 138kV transmission corridor. Phase 2 includes: (1) the
5 installation of three underground 46kV lines in the Kakaako, Makiki, and
6 McCully areas, and (2) a 138kV/46kV transformer installation at the existing
7 Archer Substation with associated protective relaying. Implementing the
8 proposed project in two phases has been proposed to address near-term
9 transmission problems, such as the Koolau/Pukele Overload Situation and a part
10 of the Pukele Substation Reliability Concern, which includes Waikiki, in a more
11 timely manner.

12 Q. By filing these supplemental testimonies, is HECO updating the 46kV Phased
13 Project described in the Application?

14 A. Yes. In these supplemental testimonies, HECO identifies two changes to Phase 1
15 of the two-phase project, arising out of (1) our ability to utilize existing ducts for
16 some of the new 46kV circuits to be installed as part of the project, and (2) our
17 decision to extend a planned 46kV underground segment instead of using an
18 existing overhead 46kV line on Pumehana Street. We also are updating (1) the
19 schedule for the proposed project to reflect current information with respect to the
20 review and approval process for the project, and (2) the cost estimate for the
21 project to take into account the scope and schedule changes. Based on the
22 updated cost estimate, HECO requests Commission approval to commit funds
23 (now estimated at \$55,644,000) for Item Y48500, East Oahu Transmission
24 Project, in accordance with the provisions of Paragraph 2.39(g)(2) of General
25 Order No. 7. This estimated cost could increase to \$60,910,000 if a City directive

1 on repaving is enforced. With the proposed changes, Phase 1 is now estimated to
2 be in service by mid-2007 and Phase 2 by early 2009. Despite the later service
3 date for Phase 2, the possibility still exists for scheduling conflicts with various
4 City initiated projects for King Street as noted in the Application.

5 Q. With the two changes, how would you now describe Phase 1?

6 A. Phase 1 involves the installation of 0.5 miles of underground ductline for 46kV
7 subtransmission lines, and related work at eight substations, in order to
8 interconnect three 46kV circuits out of the Pukele Substation, at the end of
9 HECO's Northern 138kV transmission corridor, to four 46kV lines connected to
10 HECO's Southern 138kV transmission corridor. Phase 1 includes: (1) the
11 installation of six underground 46kV lines in the Ala Moana, McCully, Moiliili,
12 and Kapahulu areas, (2) a 138kV/46kV transformer installation at the existing
13 Kamoku Substation with associated protective relaying, (3) a 46kV/12kV
14 transformer installation at the existing Makaloa Substation with associated
15 switchgear, (4) various switching and reconnections on the existing 46kV and
16 12kV systems near Makaloa and McCully Substations, (5) the removal of existing
17 46kV and 12kV cables between Makaloa and McCully Substations, (6) the
18 removal of an existing 46/12kV transformer and associated switchgear from the
19 McCully Substation, and (7) modifications of various existing distribution
20 substations in the Honolulu area.

21 Q. With these proposed changes, does HECO still seek a favorable Commission
22 determination regarding the proposed 46kV lines being built underground?

23 A. Yes. Pursuant to HRS Section 269-27.6, HECO still seeks a favorable
24 Commission determination on the proposed 46kV lines being built underground.

ISSUES

Q. Please identify the issues in this case as adopted under Commission Order No. 20968, and identify the testimonies that were filed with the Application that address these issues?

A. The issues in this case are:

1. *Whether HECO's proposed expenditures for Phases 1 and 2 of the East Oahu Transmission Project will provide facilities which are reasonably required to meet HECO's present or future requirements for utility purposes?*

My testimony, HECO T-1, addresses this issue from a policy perspective.

Mr. Pollock's testimony, HECO T-3, discusses the system planning process, developing planning criteria, and HECO transmission planning criteria as it relates to this project. Finally, Ms. Ishikawa's testimony, HECO T-4, discusses HECO's planning process and the need for this project.

2. *Whether HECO's selected routing, location, configuration and method of construction for Phases 1 and 2 of the East Oahu Transmission Project are reasonable?*

Mr. Wong's testimony, HECO T-2, describes the proposed project and its location. Mr. Morikami's testimony, HECO T-7, discusses the routing and underground construction issues related to this project. Finally, Mr. Harrington's testimony, HECO T-8, discusses the construction schedule and impacts of the proposed project.

3. *Whether HECO's East Oahu Transmission Project is preferable to HECO's other 138kV and 46kV transmission system alternatives, comparing factors such as, but not limited to the following:*

a) *Cost;*

- b) *Timeliness and Schedule;*
- c) *Effectiveness;*
- d) *Construction impacts;*
- e) *Electromagnetic fields;*
- f) *Other impacts, if any;*
- g) *Public sentiment; and*
- h) *The public welfare in general.*

In my testimony, HECO T-1, I discuss the need to provide reliable electric service and how the proposed project was selected among other 138kV and 46kV alternatives. Mr. Wong's testimony, HECO T-2, provides the project background. Ms. Ishikawa's testimony, HECO T-4, describes various 138kV and 46kV alternatives that were considered and their effectiveness in addressing the project objectives. Mr. Wong's testimony, HECO T-6, discusses the timeliness and schedule of certain 138kV and 46kV alternatives. Mr. Harrington's testimony, HECO T-8, discusses the construction impacts of certain 138kV and 46kV alternatives. Ms. Oshiro's testimony, HECO T-9, discusses the costs of certain 138kV and 46kV alternatives. Mr. Silva's testimony, HECO T-10, discusses potential EMF levels from certain 138kV and 46kV alternatives. Mr. Bonnet's testimony, HECO T-11, discusses the State and HECO's respective policies on EMF. Finally, Mr. Alm's testimony, HECO T-12, discusses the public sentiment to certain 138kV and 46kV alternatives considered.

4. *Whether HECO's East Oahu Transmission Project is preferable to other feasible non-transmission options?*

Ms. Ishikawa's testimony, HECO T-4, discusses various non-transmission options and their respective effectiveness in addressing the project objectives.

Mr. Stewart's testimony, HECO T-5, discusses Live-Working, sometimes referred to as Live-Line Maintenance, and its feasibility in addressing the project objectives.

5. Pursuant to the requirements of HRS 269-27.6(a), whether all (as proposed by HECO) or part of the 46kV lines that are part of HECO's East Oahu Transmission Project should be placed, constructed, erected or built below the surface of the ground?

Mr. Morikami's testimony, HECO T-7, discusses the routing issues with the proposed project, which include the issue of constructing the proposed 46kV lines underground.

WRITTEN SUPPLEMENTAL TESTIMONIES

Q. Why are supplemental testimonies being filed at this time?

A. In the Proceedings Schedule approved by the Commission in Order No. 20968, HECO was provided an opportunity to file supplemental testimonies in support of the case by July 22, 2004.

Q. What supplemental testimonies does HECO present to support its application filed on December 18, 2003?

A. A total of ten witnesses, including myself, have submitted eleven written supplemental testimonies with supporting exhibits, which support this application. The witnesses, including myself, and the subject matters of their testimonies are as follows:

Witness

Number

Witness

Subject

ST-1

Thomas L. Joaquin

Overview of Supplemental Testimonies

ST-2

Kerstan J. Wong

Description of the Proposed Changes

1	ST-4	Shari Y. Ishikawa	Changes to the Single Line Diagrams
2			("SLD"), Corrections to the Direct
3			Testimony and March 3, 2004 Pukele
4			Substation Outage
5	ST-6	Kerstan J. Wong	Schedule Impacts
6	ST-7	Ken T. Morikami	Routing
7	ST-8	Thomas L. Harrington	Construction Considerations
8	ST-9	Earlynne F. Oshiro	Cost Impacts
9	ST-10	J. Michael Silva	Magnetic Field Evaluation
10	ST-11	William A. Bonnet	EMF
11	ST-11A	Linda S. Erdreich, Ph.D.	EMF: Epidemiology
12	ST-11B	Stuart Aaronson, M.D.	EMF: Oncology

13 The witnesses that have previously submitted testimony in this proceeding

14 are myself, as HECO T-1, Mr. Wong as HECO T-2 and HECO T-6, Ms. Ishikawa

15 as HECO T-4, Mr. Morikami as HECO T-7, Mr. Harrington as HECO T-8,

16 Ms. Oshiro as HECO T-9, Mr. Silva as HECO T-10, and Mr. Bonnet as HECO

17 T-11.

18 Witnesses Dr. Erdreich, HECO ST-11A, and Dr. Aaronson, HECO ST-11B,

19 are providing testimonies for the first time in this proceeding. Dr. Erdreich is a

20 Managing Scientist at Exponent, Inc. Dr. Aaronson holds the Jane B. and Jack R.

21 Aron Professorship and serves as Chairman of the Department of Oncological

22 Sciences at Mount Sinai School of Medicine.

23 Q. What are the most significant matters that HECO is addressing in its supplemental

24 testimonies?

25 A. In general, the following five matters are addressed:

26 Implementation of Phase 1

27 In this supplemental filing, we are updating the Commission on the planning

1 for Phase 1 of the project. HECO identifies two changes to Phase 1 that involve
2 (1) the two new 46kV underground circuits originally planned between the
3 Makaloa and McCully Substations, and (2) the proposed 46kV circuit connections
4 on Pumehana Street as described in the Application.

5 HECO now plans to use existing ducts for a significant portion of the route
6 for the two new 46kV underground circuits between the Makaloa and McCully
7 Substations instead of installing a new ductline as originally proposed. Utilizing
8 the existing ductline eliminates trenching, which reduces traffic and cost impacts
9 to the project.

10 For the proposed 46kV circuit connections on Pumehana Street, HECO now
11 proposes to connect the existing circuits in the area in an alternative manner. This
12 would result in maintaining the current operating condition of essentially zero
13 electric current flow on the existing overhead 46kV circuit on Pumehana Street
14 adjacent to Lunalilo Elementary School. In the original proposal, the operating
15 condition of the existing overhead circuit would have changed significantly.

16 Mr. Wong's supplemental testimony, HECO ST-2, describes the proposed
17 changes. Mr. Morikami's supplemental testimony, HECO ST-7, describes the
18 routing issues with these changes. Mr. Harrington's supplemental testimony,
19 HECO ST-8, describes the potential construction impacts of these changes. And,
20 Ms. Oshiro's supplemental testimony, HECO ST-9, describes the potential cost
21 impacts of these changes.

22 As noted in the Application and supporting testimonies, the timely
23 implementation of Phase 1 is particularly important, as it addresses in substantial
24 part the on-going Pukele Substation Reliability Concern, and fully addresses the
25 Koolau/Pukele Overload Situation (which was expected start in 2005, if not

1 sooner). The importance of the implementation of Phase 1 was re-emphasized by
2 the outage of Pukele Substation on March 3, 2004, which could have been
3 significantly mitigated if Phase 1 was in place. This is described in
4 Ms. Ishikawa's supplemental testimony, HECO ST-4. A report on the
5 investigation and outage cause was filed with the Commission on May 11, 2004.

6 Review of Possible Routing Changes

7 We also are updating the Commission with respect to our further
8 consideration of possible routing changes. At the request of State Senator Carol
9 Fukunaga, State Representative Scott Saiki, and City Councilwoman Ann
10 Kobayashi collectively, Kapiolani Boulevard was further examined as an
11 alternative to utilizing Fern Street for the proposed two new circuits between
12 Makaloa and McCully Substations in Phase 1. As was noted in Mr. Morikami's
13 testimony, HECO T-7, "we will continue to examine the Kapiolani Boulevard
14 route." (Subsequent to the Application filing, the Motion to Intervene in this
15 docket filed by Senator Fukunaga, Representative Saiki, and Councilwoman
16 Kobayashi ("Public Officials") was granted by Commission Order No. 20860.)

17 For Phase 2 of the project, Young Street was further examined as an
18 alternative route to King Street for the proposed three new 46kV underground
19 circuits. This further examination of Young Street was prompted at the request of
20 the City Department of Planning and Permitting during a March 11, 2004
21 pre-consultation meeting for the project's voluntary Environmental Assessment.

22 As described in Mr. Morikami's supplemental testimony, HECO ST-7,
23 further examination of Kapiolani Boulevard and Young Street continues to
24 support the initial conclusion that Fern Street (particularly given our ability to
25 reuse existing ducts) and King Street, respectively, are better alternatives for

1 routing the proposed new 46kV underground circuits.

2 Project Schedule

3 As described in Mr. Wong's supplemental testimony, HECO ST-6, the
4 overall project schedule, which was filed as Exhibit 3 in the Application, has been
5 updated to reflect current information with respect to the review and approval
6 process for the project. The revisions extend the completion dates for Phases 1
7 and 2 by an estimated six months.

8 City's Directive on Repaving

9 The supplemental testimonies update the cost estimate for the project to take
10 into account the scope and schedule changes, and address the potential cost impact
11 of the City's recent directive regarding repaving of City roadways after trenching
12 for utility installations. Ms. Oshiro's testimony, HECO ST-9, updates the cost
13 estimate. As described in Mr. Wong's supplemental testimony, HECO ST-2, the
14 City's Managing Director, with the Mayor's concurrence, issued a directive earlier
15 this year requiring private utilities to repave City roadways curb-to-curb after
16 trenching. This directive is considered excessive and beyond what is required by
17 City ordinance. Mr. Harrington's supplemental testimony, HECO ST-8, describes
18 the potential construction impacts if this directive is enforced for this project.
19 Ms. Oshiro's supplemental testimony, HECO ST-9, describes the potential cost
20 impacts.

21 EMF Exposure

22 Finally, HECO's supplemental testimonies provide additional information
23 on electromagnetic fields ("EMF") associated with the project. Mr. Bonnet's
24 supplemental testimony, HECO ST-11, discusses steps that HECO has taken to
25 further respond to concerns with EMF identified in the public comment process

1 conducted by HECO for this project in 2003. Mr. Silva's supplemental testimony,
2 HECO ST-10, discusses a study that was conducted in the project area to provide
3 more information on potential exposure levels residents could expect from the
4 project.

5 Much of the concern with EMF exposure is related to potential adverse
6 health effects. To address this concern, Dr. Erdreich's supplemental testimony,
7 HECO ST-11A, discusses EMF epidemiological studies and Dr. Aaronson's
8 supplemental testimony, HECO ST-11B, discusses EMF oncology studies.

9 Q. Do the supplemental testimonies further address the issues in the case as adopted
10 under Commission Order No. 20968?

11 A. Yes, the issues in this case that are further addressed with the supplemental
12 testimonies are as follows:

13 1. *Whether HECO's proposed expenditures for Phases 1 and 2 of the*
14 *East Oahu Transmission Project will provide facilities which are reasonably*
15 *required to meet HECO's present or future requirements for utility purposes?*

16 Mr. Wong's supplemental testimony, HECO ST-2, describes proposed changes to
17 the project. Ms. Ishikawa's supplemental testimony, HECO ST-4, addresses this
18 issue with a discussion of the March 3, 2004 Pukele Substation Outage, which
19 reconfirms the need for the project. And, Ms. Oshiro's supplemental testimony,
20 HECO ST-9, describes the potential cost impacts of the various factors presented
21 in this supplemental filing.

22 2. *Whether HECO's selected routing, location, configuration and*
23 *method of construction for Phases 1 and 2 of the East Oahu Transmission Project*
24 *are reasonable?*

25 Mr. Wong's supplemental testimony, HECO ST-2, describes the proposed

1 changes to the project. Mr. Morikami's supplemental testimony, HECO ST-7,
2 further discusses the routing issues related to this project. Finally, Mr.
3 Harrington's supplemental testimony, HECO ST-8, discusses the potential
4 construction impacts of the various factors presented in this supplemental filing.

5 3. *Whether HECO's East Oahu Transmission Project is preferable to*
6 *HECO's other 138kV and 46kV transmission system alternatives, comparing*
7 *factors such as, but not limited to the following:*

- 8 a) *Cost;*
- 9 b) *Timeliness and Schedule;*
- 10 c) *Effectiveness;*
- 11 d) *Construction impacts;*
- 12 e) *Electromagnetic fields;*
- 13 f) *Other impacts, if any;*
- 14 g) *Public sentiment; and*
- 15 h) *The public welfare in general.*

16 Mr. Silva's supplemental testimony, HECO ST-10, discusses an EMF study done
17 for the project. Mr. Bonnet's supplemental testimony, HECO ST-11, introduces
18 the supplemental testimonies on EMF. Dr. Erdreich's supplemental testimony,
19 HECO ST-11A, discusses EMF epidemiological studies. And, Dr. Aaronson's
20 supplemental testimony, HECO ST-11B, discusses EMF oncology studies.

21 5. *Pursuant to the requirements of HRS 269-27.6(a), whether all (as*
22 *proposed by HECO) or part of the 46kV lines that are part of HECO's East Oahu*
23 *Transmission Project should be placed, constructed, erected or built below the*
24 *surface of the ground?*

25 Mr. Morikami's supplemental testimony, HECO ST-7, further discusses the

1 routing issues with the proposed project, which include the issue of constructing
2 the proposed 46kV lines underground.

3
4 SUMMARY

5 Q. Please summarize your testimony.

6 A. Commission Order No. 20968 adopted, among other things, issues in the case and
7 a proceedings schedule, which allows for HECO to provide supplemental
8 testimonies by July 22, 2004. The testimonies filed with the Application on
9 December 18, 2003 addressed the issues adopted by the Commission. The
10 supplemental testimonies now being filed further address these issues.

11 HECO requests Commission approval to commit funds (now estimated at
12 approximately \$55,644,000) for Item Y48500, East Oahu Transmission Project, in
13 accordance with the provisions of Paragraph 2.3(g)(2) of General Order No. 7.
14 The cost could increase to \$60,910,000 if the City's directive on repaving is
15 enforced. Phase 1 is now estimated to be in service by mid-2007 and Phase 2 by
16 early 2009. (There may be potential scheduling conflicts with Phase 2 due to
17 various City-initiated projects planned for King Street, which could impact when
18 the construction of Phase 2 is actually started and completed.) HECO also
19 continues to request that a favorable Commission determination be made that the
20 new 46kV lines for the East Oahu Transmission Project be built below the surface
21 of the ground pursuant to HRS Section 269-27.6 (a).

22 Q. Does this conclude your testimony?

23 A. Yes, it does.
24
25